Research Note

NORTHERN ROCKY MOUNTAIN
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INFILTRATION ON A TIMBER AND A BURN SITE IN NORTHERN IDAHO

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Infiltration[1/] tests were made in 1952 on a timbered site and a burned site on Upper West Branch Creek, Kaniksu National Forest, in northern Idaho. Although these tests, made in connection with other work, are incomplete in terms of conventional infiltration tests, they provide an illustration of relative infiltration on the two sites.

The "timber" site supports a stand composed largely of western hemlock (figure 1) over 200 years of age. Low vegetation is mainly goldthread covering less than one-tenth of the ground surface. The "burn" site was identical to the timber site until burned over by wildfire in 1926. The standing material left after this fire was felled and prescribed broadcast burned in 1935. Overwood on the burn site now consists of planted ponderosa pine and natural regeneration of mostly western larch and northern black cottonwood (figure 2). Low vegetation consisting primarily of spirea, huckleberry, and pachistima covers one-tenth of the soil surface.

The soil at both sites is Mission silt loam, a series common in northern Idaho and northeastern Washington. The surface 10 to 12 inches is light yellowish-brown, partly loessial, silt loam. A light yellowish-gray, cloddy, compact, silty-clay subsoil extends to depths of 30 to 45 inches.

Artificial rainfall on two plots at each site was applied with a Rocky Mountain infiltrometer (1) (figure 1). This rainfall simulator produces a rain intensity between 3.5 and 5.2 inches per hour. Rainfall application and runoff on the test plots are summarized as follows:

1/ Infiltration refers to the passage of water through the soil surface into the scil.

Site	Plot No.	Date	Slope	Duration of rainfall application	Rainfall applied	Runoff
			(percent)	(minutes)	(inches)	(inches)
Timber	1	8-4	5	240	14.36	0
		8-6		180	10.50	0
	2	8-14	8	120	8.92	0
		8-15		180	12.60	0
Burn	1	8-13	3	30	1.90	0.12
		8-15		80	6.86	4.04
	2	8-20	3	47	3.67	0.99
		8-22		80	5.63	1.44

Rainfall was also artificially applied to other study plots but runoff amounts were not determined. Each application lasted only until runoff started. At the burn site, for example, rainfall was applied 33 different times. The maximum elapsed time from the beginning of rainfall to the beginning of runoff was 15 minutes. In contrast, rainfall was applied in a similar manner seven times during the same season at the timber site, with one hour of application in each case and no runoff.

The major factor influencing infiltration appears to be the amount of ground cover. Soil at the timber site is covered with a duff layer approximately 2 inches deep. Some soil protection is afforded by the high vegetation on the burn site, but the duff layer 17 years after the prescribed burn is thin and discontinuous. An appreciable area of the soil surface is unprotected from the puddling effects of raindrops. The result is a decrease in ability to absorb water. Observations from a rainfall intensity gauge indicate that natural rainfall only occasionally exceeds the 2.8 inches per hour infiltration capacity of the soil at the burn site. Thus soil stability is not a serious problem on this nearly level area despite the effects of burning on the infiltration capacity of the soil. Under less favorable topographic and soil textural conditions or greater rainfall intensities, the disturbance of the protective cover of vegetation could result in significant damages both on and below the site.

LITERATURE CITED

(1) Dortignac, E. J.
1951. Design and operation of the Rocky Mountain infiltrometer. Rocky Mountain Forest and Range Experiment Station Paper No. 5.

Figure 1. Old growth western hemlock stand on "timber" site. Apparatus shown is the field installation for an infiltration test. Not shown are the truck-mounted water supply tank and pump.

Figure 2. Planted ponderosa pine and natural western larch and northern black cottonwood on the "burn" site.


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